In the specification:

Please amend the paragraph beginning on page 1, line 14, as follows:

Linear motors (linear-servo motors) have been developed to solve the problem of achieving linear motion without having to translate rotational motion (from a conventional rotary motor) to linear motion. Linear motors can achieve accurate and highly controlled linear displacement without problems such as backlash. Also, linear motors achieve linear motion with extremely low vibration. Consequently, linear motors are used extensively in contemporary moving-stage mechanisms such as used in any of various micro-electronic device-fabrication methods. For example, microlithography apparatus include at least one stage (for holding a reticle or wafer) that is displaceable using a linear motor.

Please amend the paragraph beginning on page 1, line 23, as follows:

A linear motor typically has a stationary portion (termed a "stator") and a movable portion (termed an "armature"). In a type of linear motor frequently used in micro-electronic-device fabrication apparatus, the stator defines a longitudinally extended slot in which the armature is inserted. The stator typically contains an array of permanent magnets that produce a cyclic distribution of magnetic flux density (see FIG. 31). The armature typically comprises an electromagnetic coil to which electric current is applied. The resulting interaction of the magnetic fields produced by the armature coil with the magnetic flux produced by the stator resultresults in linear motion of the armature relative to the stator.

Please amend the paragraph beginning on page 2, line 20, as follows:
The eddy current I_e, in turn, produces moving-direction and reverse-direction force components (viscous resistance) that are added to the driving-force vector of the armature. An excessive viscous resistance causes a substantial reduction in the driving force applied to the armature, resulting in a corresponding loss of motor output. Hence, there is a need to reduce the viscous resistance as much as possible.

Please amend the paragraph beginning on page 5, line 6, as follows:

FIGS. 9(B)-9(C) are electrical schematic diagrams of respective schemes for reducing eddy-current ~~feed-back~~feedback from one trace to other traces, as described in the fourth representative embodiment.

Please amend the paragraph beginning on page 7, line 26, as follows:

A sheet coil 10 according to this embodiment is shown in FIGS. 1 and 2. The depicted sheet coil is especially suitable for incorporation into an armature of a moving-coil type of linear motor.

Please amend the paragraph beginning on page 10, line 11, as follows:

As a result of folding the sheet-coil substrate 12 into pleats along the mountain folds 12a and the valley folds 12b, each wiring-trace pattern 13 (including respective conductors 14, 15, 16) formed on the sheet-coil substrate 12 is folded every half cycle (λ/2) and becomes a respective individual hexagonal coil 11 (including constituent partial coils 21, 22, 23), as shown in FIGS. 1 and 2. Also, as noted above, the exposed first ends 35, 36, 37 of the conductors 14, 15, 16 become the electrodes ~~31,e~~31e, 32e, 33e of the first ends 31, 32, 33 of the partial coils 21, 22, 23, respectively. Similarly, the second ends 45, 46, 47 of the conductors 14, 15, 16 become the electrodes 41e, 42e, 43e of the second ends 41, 42, 43 of the partial coils 21, 22, 23, respectively.

Please amend the paragraph beginning on page 13, line 13, as follows:

When considering the respective counter-EMFs E_1, E_2, E_3 generated at the partial coils 21, 22, 23 of each coil 11, an exemplary equivalent circuit of each group (U, V, W) of the coils 11 of the sheet coil 10 is shown in FIG. 9(A). Each of the three paths A, B, C ~~are~~is connected in parallel, and the circuit is closed by passing AC current of a given phase through the connection points 27, 28. In path A, a respective counter-EMF E_1 is generated by each partial coil 21 in the path. The sum $\sum E_a$ of the counter-EMFs for path A is $\sum E_a = E_1 + E_1$. Similarly, the sum $\sum E_b$ of

the counter-EMFs for path B is $\sum E_b = E_2 + E_2$, and the sum $\sum E_c$ of the counter-EMFs for path C is $\sum E_c = E_3 + E_3$. As noted above, $E_1 \neq E_2 \neq E_3$. Consequently, $\sum E_a \neq \sum E_b \neq \sum E_c$. In other words, at any instant in time, electric potential differences exist between the parallel paths A, B, C. As a result, a new current I_b, different from the eddy current I_a (FIG. 8), flows through the closed loop and through the connection points 27, 28 according to these electric-potential differences. The new current I_b is termed the "loop current ~~I_b~~ $\underline{I_b}$." The direction and magnitude of the loop current I_b are determined by the size relationships of $\sum E_a$, $\sum E_b$, and $\sum E_c$. Of these sums $\sum E_a$, $\sum E_b$, $\sum E_c$, the greater the difference between the largest and smallest sum, the larger the loop current I_b.

Please amend the paragraph beginning on page 15, line 20, as follows:

As shown in FIG. 11, the connection of the respective three coils 11 that form each group is made using the respective first-end electrodes 31e, 32e, 33e and the respective second-end electrodes 41e, 42e, 43e. (In FIG. 11, only the connections for one group of coils ~~is~~ <u>are</u> shown. Of this group as depicted, the left-hand coil is termed the "first coil" 11, the middle coil is termed the "second coil" 11, and the right-hand coil is termed the "third coil" 11.) Each coil 11 is simplified by being shown with only one turn per coil 11, and the first-end electrodes 31e, 32e, 33e and second-end electrodes 41e, 42e, 43e are shown laterally shifted for clarity.

Please amend the paragraph beginning on page 18, line 20, as follows:

Whereas this embodiment was described in the context of a sheet coil incorporated into a moving-coil type of linear motor, it also is possible to use the sheet coil in a moving-magnet type of linear motor, in which partial coils can be serially connected together in each group. In the moving-magnet type of linear motor, as shown in FIG. 32, the coils 11 (m = 9 as shown) are stationary and a "relative-moving member" 18 moves relative to the coils 11. The relative-moving member 18 does not overlie all the coils 11 but rather only some of them (total of four as shown). The relative-moving member 18 comprises four magnetic elements 18a-18d. Only a portion of each coil 11 actually faces the magnetic elements 18a-18d of the relative-moving member 18, contributing to the generation of drive force. The counter-EMF is generated only in

those partial coils that face the magnetic elements 18a-18d of the relative-moving member 18. As a result, in dividing each of the coils 11 into respective multiple partial coils n (n = 4 as shown), it is not necessary to deal with all m (m = 9) of the coils 11. Rather, the number of partial coils n can be established according to "p" (the number of coils 11, of all the m coils, that actually face the magnetic elements 18a-18d of the relative moving member 18). In this configuration, the number of partial coils in each coil 11 can be p or a divisor of p. Of course, the number of slits in each coil 11 is p – 1.

Please amend the paragraph beginning on page 24, line 12, as follows:

Similar to the sheet coil 10 of the first representative embodiment, a sheet coil according to this embodiment can be incorporated into the armature of a moving-coil type of three-phase linear motor. The sheet coil of this embodiment differs from that of the first representative embodiment (FIGS. 1-9) mainly in the configuration of connections between the coils. Other structures (including the structures of the coils 11 themselves and the number of coils 11) are the same as in the sheet coil 10 of the first representative embodiment. These similar structures are not described further below.

Please amend the paragraph beginning on page 25, line 18, as follows:

During operation of a moving-coil type of three-phase linear motor including the sheet coil of this embodiment, the sheet coil (incorporated into an armature) moves relative to the magnetic field (having a cyclical distribution of magnetic flux) formed by the stator. As a result, the instantaneous rate of change of the stator magnetic flux Φ "seen" by each partial coil 21, 22, 23 changes according to the position of the respective partial coil 21-23 relative to the magnetic fields produced by the stator. A different counter-EMF E is generated for each of the partial coils 21, 22, and 23 in each coil ($E_1 \neq E_2 \neq E3$).

Please amend the paragraph beginning on page 27, line 24, as follows:

For example, consider a case in which each coil 11 is divided into n partial coils. With each group of coils of this embodiment, a closed loop in which n paths (A, B, C, . . .) are connected in parallel is formed (an equivalent circuit is shown in FIG. 20). With respect to the n partial coils, unequal counter-EMFs E_1, E_2, E_3, . . ., E_n are generated. With the coil-interconnection scheme of this embodiment, different respective counter-EMFs generated at each partial coil can be averaged. As a result, the sum of the counter-EMFs at the n paths A, B, C, . . . ($\sum E_a$, $\sum E_b$, $\sum E_c$, . . .) are $(E_1 + E_n)$, $(E_2 + E_{n-1})$, $(E_3 + E_{n-2})$, . . ., $(E_{n-1} + E_2)$, and $(E_n + E_1)$ are approximately equal to each other.

Please amend the paragraph beginning on page 28, line 8, as follows:

If the number of coils 11 per group is greater than 2 (i.e., if m > 2), then the sums $\sum E_a$, $\sum E_b$, $\sum E_c$, . . ., $\sum E_n$ of the respective counter-EMFs of the n paths (A, B, C, . . .) are $(E_1 + E_n + E_1 + E_n + . . .)$, $(E_2 + E_{n-1} + E_2 + E_{n-1} + . . .)$, $(E_3 + E_{n-2} + E_3 + E_{n-2} \underline{+} . . .)$, . . . $(E_{n-1} + E_2 + E_{n-1} + E_2 \underline{+} . . .)$, and $(E_n + E_1 + E_n + E_1 \underline{+} . . .)$.

Please amend the paragraph beginning on page 29, line 6, as follows:

Additional approaches can be used for further reducing "eddy-current ~~feed-back~~feedback" from one of the traces to the others. In FIG. 9(A), all traces are tied together, at the right end in the figure, at the point 28 and, at the left end in the figure, at the point 27. By opening at least one of these common connections 27, 28 to allow current to be fed independently to each trace, no eddy-current ~~feed-back~~feedback occurs. For example, in FIG. 9(B), items 25A, 25B, and 25C are respective current drives that provide electrical current according to respective commands from the system controller. The current drives 25A, 25B, 25C do not change their output current if their output voltage fluctuates. Hence, as the voltage output of E1, E2, and/or E3 changes, no change occurs in the electrical current delivered to the respective traces.

Please amend the paragraph beginning on page 29, line 16, as follows:

Another approach for isolating changes in E1, E2, and/or E3 from causing eddy-current ~~feed-back~~feedback is to use additional resistance in series with each trace, as exemplified by the scheme shown in FIG. 9(C). This scheme is especially usable if respective voltage variations in E1, E2, and/or E3 are small. In FIG. 9(C), the drive source 25 can be a current or voltage drive. The resistors 21A, 22B, 23C are located away from the motor. The resistance values are selected to allow E1, E2, E3 voltage variations to have only a negligible effect on the system. Since the resistors 21A, 22B, 23C are not part of the winding, they can be located away from heat-sensitive components. This scheme of adding remote resistors effectively adds to the respective resistances 21, 22, and 23 without adding heat to the motor.

Please amend the paragraph beginning on page 35, line 20, as follows:

For exposure, the controller 720 outputs commands to the stage controller 719, based on data concerning position of the reticle R (from the reticle-position interferometer 716) and position of the substrate W (from the substrate-position interferometer 831). The stage controller 719 causes the linear motor 100 of the reticle stage 750 and the planar motor 870 of the substrate stage 800 to the move the reticle R and wafer W, respectively, in a synchronous manner. Thus, a desired scanning exposure is performed.

Please amend the paragraph beginning on page 36, line 1, as follows:

The reticle stage 750 comprises multiple linear motors 100 as described above. Each linear motor 100 has an armature with a sheet coil, as described above. Three-phase current is supplied as appropriate to the respective sheet coils to achieve a desired and controlled movement of the reticle R. Meanwhile, the linear motors ~~100are~~100 are cooled as described above.

Please amend the paragraph beginning on page 39, line 1, as follows:

If the exposure-energy beam is in the far-ultraviolet portion of the electromagnetic spectrum (e.g., produced by an excimer laser), the illumination-optical system and projection-optical system typically include <u>respective</u> lens elements that are transmissive to the far-ultraviolet radiation (e.g., quartz or fluorite). If the energy beam is produced by an F_2 excimer laser or is comprised of X-rays, then a catadioptric or reflective optical system is used (along with a reflective-type reticle). If the energy beam is an electron beam, then the illumination-optical system and projection-optical system include <u>respective</u> electron lenses and deflectors. The electron beam must propagate in a vacuum environment.